



# Desktop Videoconferencing



Prepared for: DARPA

Prepared by: Edward Buckingham  
Sr. Analyst, Desktop Graphics and  
Multimedia September 1997



# Agenda

- Definition and Technology Overview
  - Technical Specifications
- Primary Issues
  - Quality (QoS) vs. Cost
  - Infrastructure Bandwidth
  - Video, Voice, Data Synchronization
  - Security
- Potential Expert Partners
- Summary



# Desktop Videoconferencing

IDC defines Desktop Videoconferencing as:

*“the real-time, simultaneous video and voice collaboration between two or more individuals using PC-based capture and transmission technologies.”*



# Technology Overview

	POTS	ISDN	LAN	Internet
Channel type	Circuit-switched	Circuit-switched	Packet-switched	Packet-switched
Bandwidth	Low: Confined by standard 28.8 Kbps modems; but 33.6 Kbps are available and 56 Kbps coming soon (1H 1997)	Good: Standard ISDN-BRI provides two 64 Kbps channels (combined for 128 Kbps); Pooling multiple ISDN lines also optional	Very high: Typical Ethernet network theoretical capacity of 10 Mbps; Newer Ethernet handle 100 Mbps but this is shared	Low to moderate: (most connections over 28.8 modems or ISDN lines); Has bandwidth limits of CS access w/ real-time limits of PS network
Typical DVC Environment	Home and small business	Primarily corporate and small business; some home	Most common in corporations and campus settings	Home and small business
Access	Easy and ubiquitous	Some limitations; Difficult to set up	Typically in existence	Rapidly expanding; getting easier
Key advantages	Low-cost and everywhere	Decent bandwidth, Offers pro quality video (generally 10 to 20 fps; some 30 fps); larger window	Superior bandwidth (theoretically); infrastructure generally in place	Inexpensive and widely connected
Key disadvantages	Low bandwidth; poor video quality (4-12fps); small video windows	Relative cost, access and ease of use	Complexity and contention issues; Awaiting maturity of new standards	Quality; Firewalls-access problems; new standards; fear of IP collapse
Cost factors	Low	Moderate	Moderate	Low
Key standards	H.324; V.80 modems	H.320 for ISDN	H.323; IETF's RTP and RSVP	H.323, IETF's RTP and RSVP



# Technical Specs

*“A wealth of information about technical specs is available on the Internet.”*

- H.320 describes a videoconferencing system.
- H.320 and H.261 are equivalent to px64 which describes recommendations for video codec transmissions in 64 kbps multiples.
- H.320 was developed with ISDN in mind (Integrated Services Digital Network).
- H.231 describes multipoint with digital channels up to 2.0 Mbps.
  - H.231 also describes the connection of three or more H.320 codecs for multipoint videoconferencing
- T.120 describes a data conferencing system.



# Key DVC Drivers

- Better off the shelf solutions available.
  - Low cost and easy to install.
- Increased raw computing power.
- Significant decline in entry level DVC prices.
  - NetMeeting plus a camera and capture board.
- Advances in connectivity standards.
- DVC freeware (Microsoft's NetMeeting 2.0).



# Key DVC Hurdles

- Limited compelling perception of need.
- Infrastructure Bandwidth.
  - More later
- Overall experience when judged against TV benchmark.
- Security
  - More later



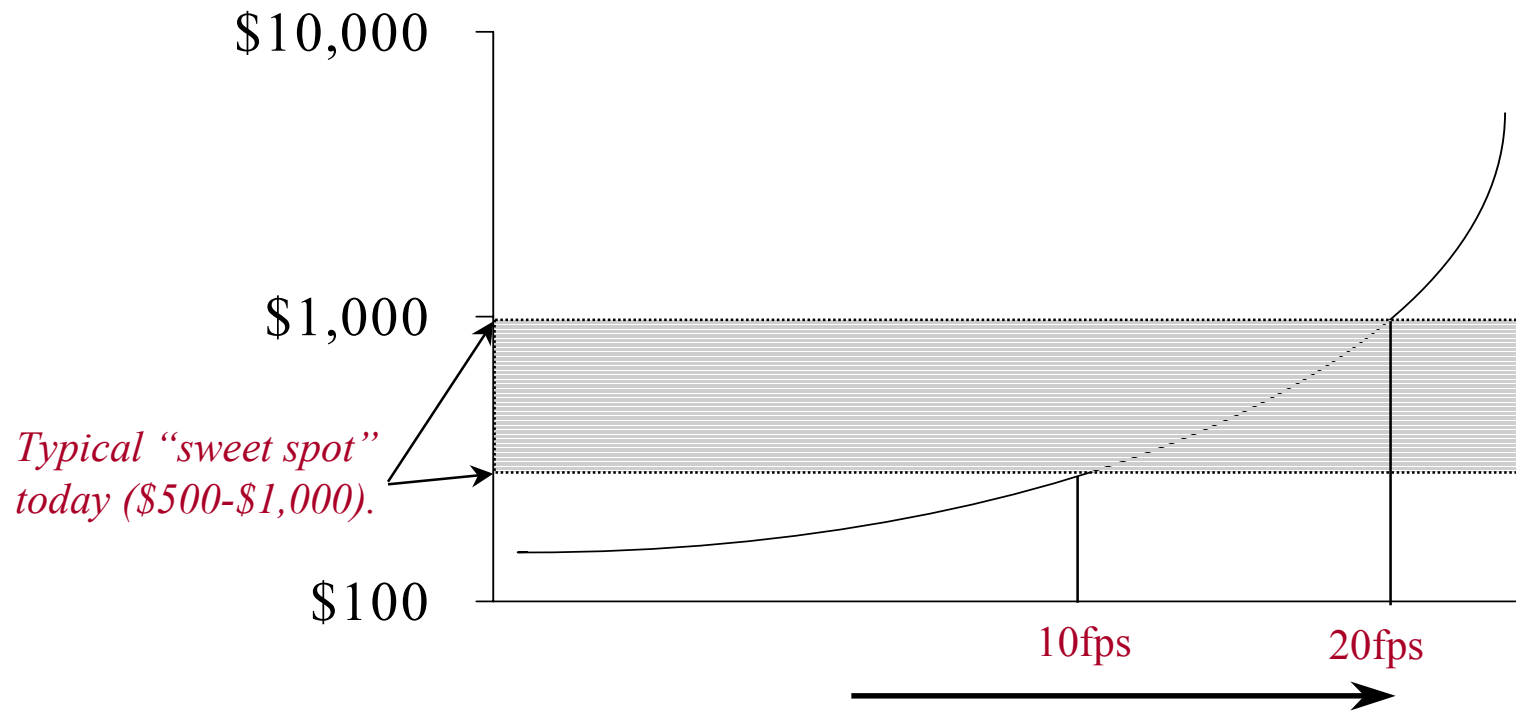
# Primary Issues

- Quality (QoS) vs. Cost
- Infrastructure Bandwidth
- Data Synchronization
- Security





# Quality (QoS) vs. Cost



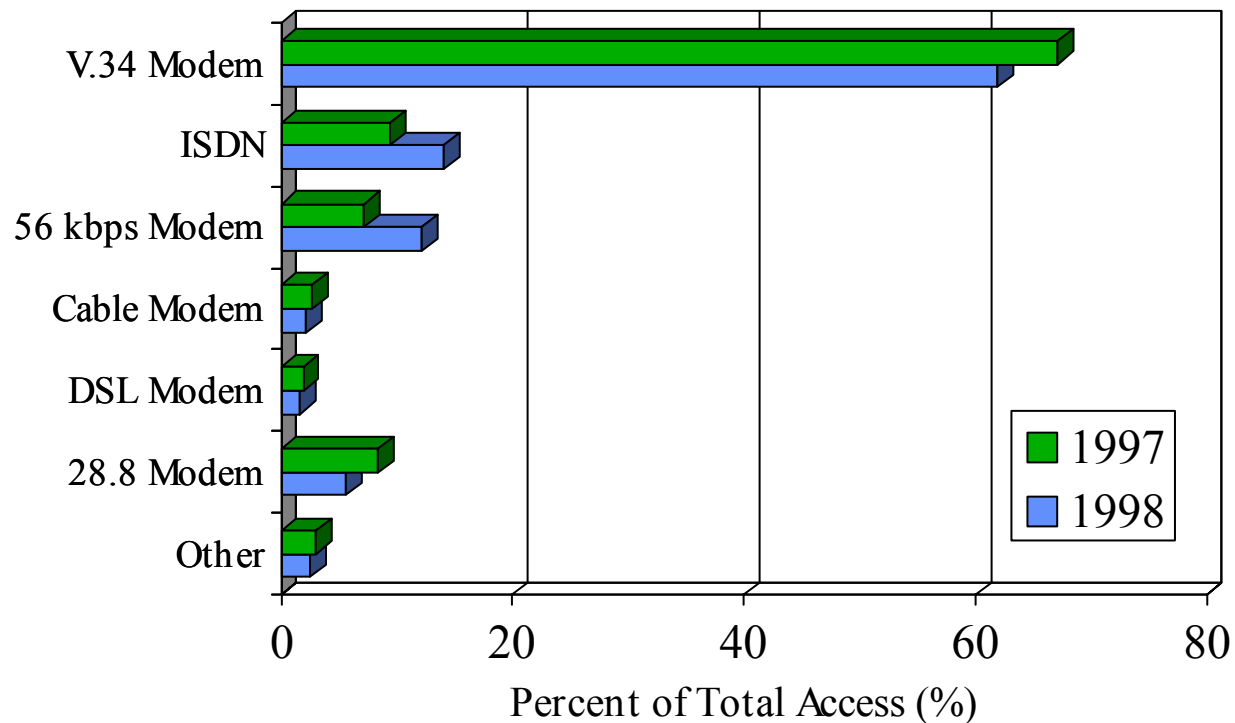
\* Quality (Subjective Measure)

\* Increasing Demand for Quality



# Infrastructure Bandwidth

Current Employee Remote Access Equipment Use,  
1997 & 1998E



Source: IDC Data Communications Group, 1997



# Data Synchronization

- Audio and Video Information must be Synchronized.
  - Network traffic causes information to arrive at receiver out of sync. Too much traffic forces voice and video misalignment. Solution is to reduce frame rate and allow signals to catch up. Low quality experience results.
- Audio and Data much more forgiving.
  - Significant delays in audio and data not a problem.
  - For example, satellite transmission delay.
- Video is least forgiving and also most troublesome.
  - Video simultaneously consumes the maximum bandwidth available and must sync perfectly.



# Security

- Confidentiality system H.233 added to the H.320 specs in 1992.
  - True confidentiality is transitory.
- Security remains significant issue.
  - encryption/decryption keying.
- Most common business protocol, “keep sensitive material out of transmission media.”
  - Treat videoconferencing similar to telephone, e.mail, “regular” mail, “hallway conversations”.



# Potential Expert Panel Partners

At present there are over 100 participants in the videoconferencing market. Most of these participants are small organizations offering limited resources for product development and innovation. Below is a list of top organizations we feel have sufficient resources and organizational structure to act as an expert partner in developing complete systems.

- Intel - *[www.intel.com](http://www.intel.com)*
- Lucent - *[www.lucent.com](http://www.lucent.com)*
- PictureTel - *[www.pictel.com](http://www.pictel.com)*
- VideoServer - *[www.videoserver.com](http://www.videoserver.com)*
- VTEL - *[www.vtel.com](http://www.vtel.com)*



# Summary

- Videoconferencing is beginning to show some market strength from both technologies and products.
- Bandwidth is now and will continue to be the primary hurdle for market expansion.
- Standardized technical specifications are smoothing the widespread adoption of DVC.
- In business, data conferencing may be the more important application going forward.
- DVC will continue to expand on an “as needed” basis with appropriate ROI analyses throughout business.
- Consumer market expected to be most significant arena in the near term.